The MISR_ENVI Tool

Overview

The misr_envi tool makes available in ENVI the data from a MISR Level 1B2 radiance file in the original stacked block grid format. The data are automatically geolocated and the band information is correctly interpreted, improving the way ENVI understands such files and presents their contents. The tool can be used with ENVI version 4.0 and higher.

The package allows the user to specify a MISR file to work with and to select a set of contiguous blocks of interest within the file. For each of the four MISR wavelength bands, the selected blocks are appended together, applying the horizontal block offsets in the process so the blocks retain the proper spatial orientation. The block group is geolocated using projection information read from the file and calculated for the specified start block. The bands are then added to the ENVI Available Bands List. If the MISR Ancillary Geographic Product (AGP) file for the corresponding path is available, that file can be opened and the latitude, longitude and elevation fields will be added to the Available Bands List. However, the AGP file is not required and the software can be used without it.

Background information about the MISR stacked block grid file format and MISR geolocation can be found in Appendix A of the MISR Data Products Specification document, available online from the Documentation section of the NASA Langley Atmospheric Sciences Data Center MISR data sets web page:

http://eosweb.larc.nasa.gov/PRODOCS/misr/table_misr.html

Assistance with this software package may be obtained by contacting:

NASA Langley Atmospheric Sciences Data Center
User and Data Services
MS 157D, 2 S. Wright Street
Hampton, VA 23681-2199

e-mail: larc@eos.nasa.gov
phone : 757-864-8656
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Installation

1) Extracting the files from the delivery package.

The read software is packaged as a tar file, misr_envi.tar, which can be opened on both Unix and Windows systems. The tar file contains the IDL source code file misr_envi.pro, supporting source code programs, a file of MISR map projection data, and a sample ENVI menu file with a MISR L1B2 option added.

On Unix systems, use the tar command below to extract the files. The files will be written into the current directory on your system.

```
tar xvf misr_envi.tar
```

On Windows systems, a package such as WinZip for extracting from zipped files will also extract from tar files. Use the package's extract capability to put the package files into a directory on

your system.

If you are unable to work with the tar file package, the files may be downloaded separately from the MISR tools area on the web page,

http://eosweb.larc.nasa.gov/PRODOCS/misr/misr_envi.html

2) Copying the files to the appropriate locations in the ENVI directory structure.

Copy all of the IDL program files (files with names that end in .pro) to the ENVI save_add directory. As an example, on a PC with the latest version of ENVI installed in the standard path, the location of the save_add directory would be

C:\RSI\IDL60\products\envi40\save_add

In the ENVI map_proj directory, edit the map_proj.txt file by adding the lines from the supplied misr_map_proj.txt to the bottom of the map_proj.txt file. NOTE: It is always a good idea to save a copy of the original file before editing! The distribution package also contains a version of map_proj.txt with the MISR projection information already included, so this file may be copied into the map_proj directory in lieu of editing the original map_proj.txt file if you have not made any other changes to your map_proj.txt file. The map_proj.txt file did not change between ENVI versions 4.0 and 4.1.

Optional: To access this tool via the ENVI menu, if you have not otherwise modified the ENVI menu, copy the appropriate envi.men file supplied in this package to the ENVI menu directory. Use envi.men4.0wMISR if you are running ENVI 4.0, or envi.men.4.1wMISR if you are running ENVI 4.1, renaming the file to envi.men. Or, if you have made modifications to the default ENVI menu, you can edit that file to add a selection that will run this program. As an example, to add MISR L1B2 as a choice under the File -> Open External File -> EOS menu structure, edit your existing envi.men file and change the menu section that begins with 2 {EOS} as shown below, adding the line that begins with 3 {MISR L1B2}:

```
2 {EOS}
  3 {ASTER 1A/1B} {open aster} {envi_menu_event}
  3 {MISR L1B2} {not used} {misr_envi}
  3 {MODIS 1B} {open modis} {envi_menu_event}
```

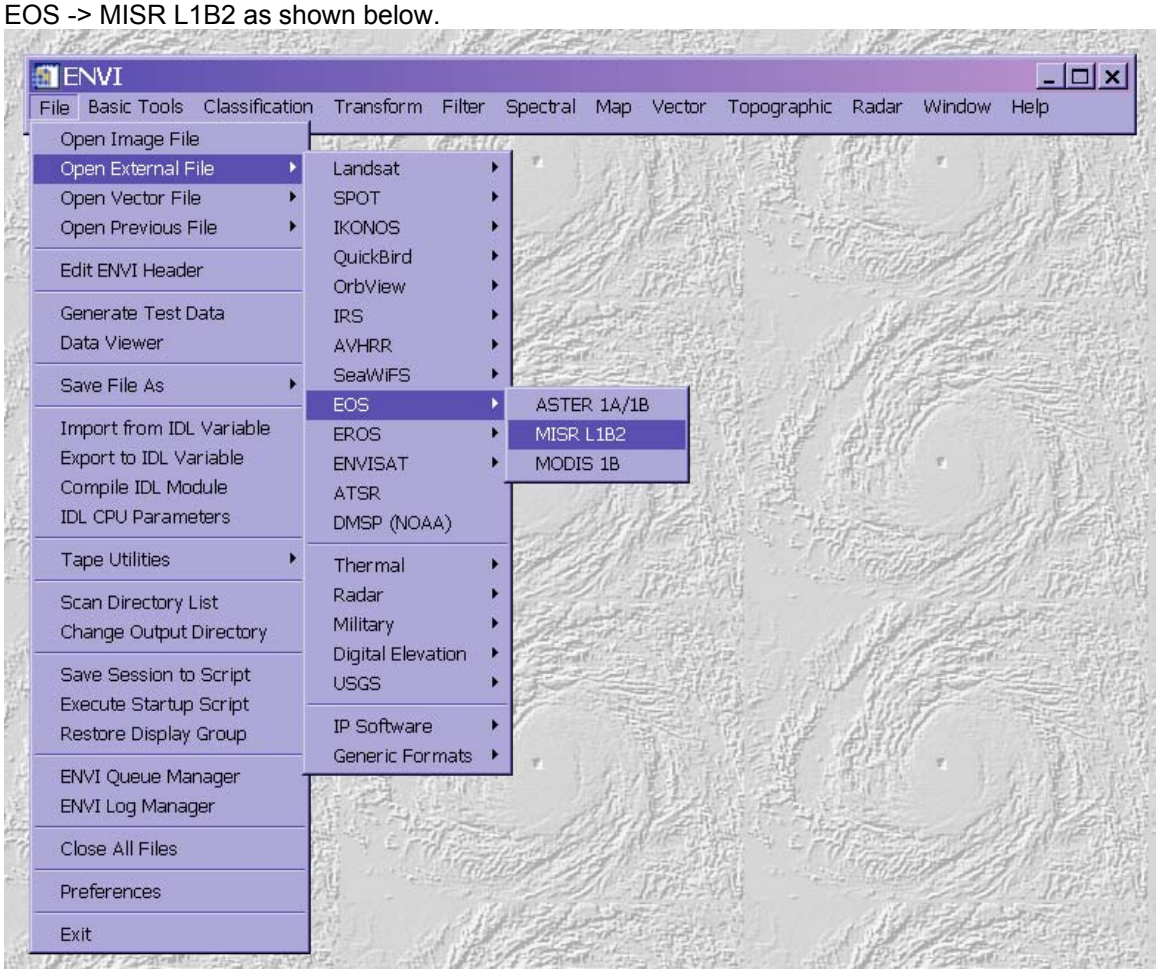
3) Customizing the directory path

The code may be customized to begin the search for data files and AGP files in directories of your choosing. To do this you will need to open and edit the misr_envi.pro file. This can be done on PCs in the IDL development environment (idlde), which is also started when ENVI is started. On Unix systems, idlde can be run from the Unix command prompt. Or any text editor may be used. If using the idlde, from the File menu, choose Open. A file selection dialog box will appear. Navigate to the ENVI save_add directory. Choose misr_envi.pro and click Open. Edit the values of the strings assigned to the variables DATApath and AGPpath to specify your file locations. These assignments are located near the beginning of the program, just after the initial section of comments. Once the changes are made, save the file (from the idlde menu bar, select File -> Save). If you are working in the idlde, you can compile the program to check that the changes did not introduce any errors. From the idlde menu, select Run -> Compile misr_envi.pro.

Running the Program

There are two ways to invoke the program:

1) If you are using a modified ENVI menu file with the added MISR L1B2 option as discussed above, the program will be invoked when that option is selected via File -> Open External File -> EOS -> MISR L1B2 as shown below.



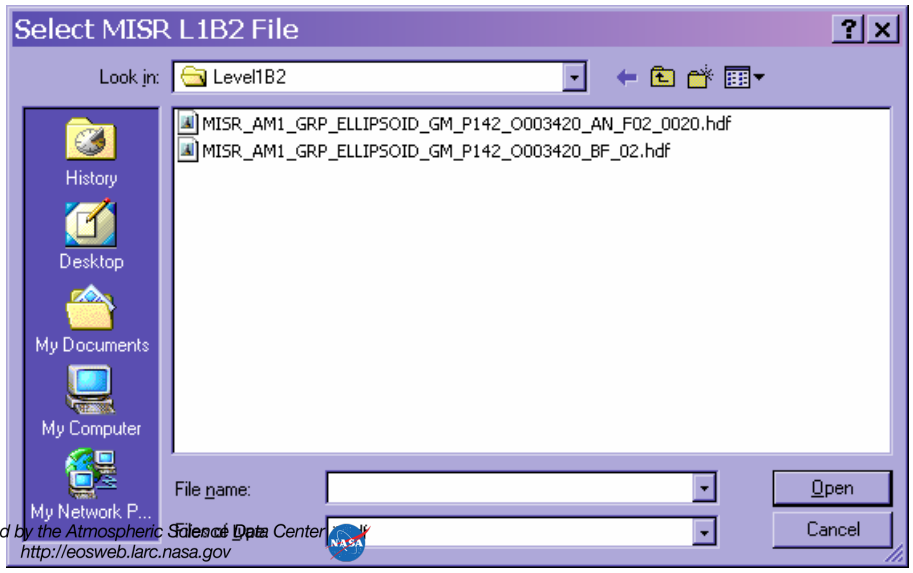
Or,

2) The program can be run from the ENVI command line. On PCs, the ENVI command line is found in the IDL development environment (idlde) window that starts at the same time ENVI is started. On Unix systems, the command line appears in the window where the command to start ENVI was entered. At the ENVI> prompt, type

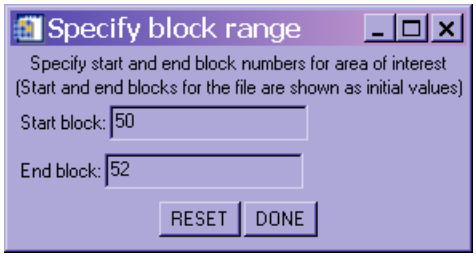
misr_envi

and the procedure will run.

A dialog box is presented for selecting a MISR Level 1B2 file. If you have customized the program with a specified directory path as discussed in the previous section, that directory will be the initial directory displayed. Use the dialog box to navigate to and open a MISR L1B2 file. Note that the program expects the MISR files to retain their original names. If the files have



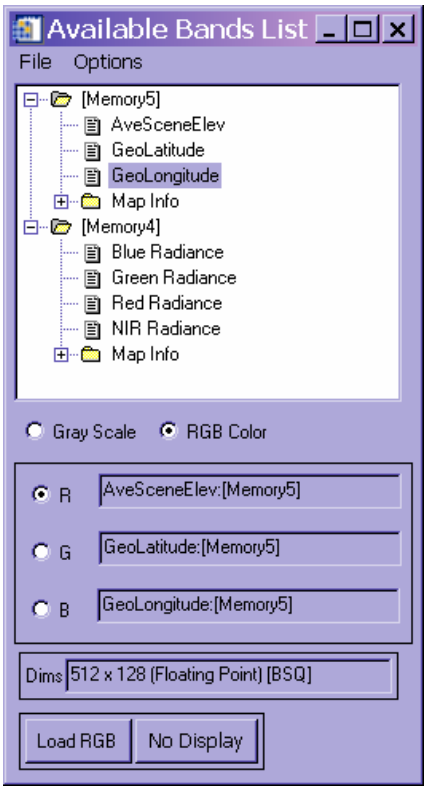
been renamed on your system, the code may not work correctly.



Next, choose the block range of interest. The initial values displayed in the dialog box for this task are the start and end blocks for the full range of good data in the selected file; that is, the daylight portion of the orbit. Enter the starting and ending block numbers for your range of interest and click DONE. Clicking the RESET button will restore the original block extent values. Note that the more blocks selected, the more memory and CPU processing is required when working with the data in ENVI. A tool for determining MISR paths and blocks that fall within a latitude/longitude box of interest is available from the Tools section of the MISR data sets web page (http://eosweb.larc.nasa.gov/PRODOCS/misr/table_misr.html).

Once the block range has been specified, the data are read and converted from raw values to scaled floating point radiances (the two low order quality bits are removed and the resulting value is multiplied by the band-appropriate scale factor). Bad radiance pixel values are set to zero. The data are geolocated and the four wavelength bands and associated mapping information are populated in the ENVI Available Bands List. For off-nadir cameras, where the red band has a higher resolution than the other three wavelength bands, the red band is resampled to match the resolution of the other bands.

A second file selection dialog box appears for opening the AGP file. If the code was customized to specify a default AGP directory, that will be the initial directory presented in the dialog box. The AGP whose satellite path number matches that of the selected MISR data file will be displayed if it exists in that directory. Use the dialog box to navigate to and open the AGP file, or click the Cancel button to continue without opening the AGP file.



If the AGP file is found and opened, the “AveSceneElev”, “GeoLatitude”, and “GeoLongitude” parameters for the previously selected block range are read and populated in the ENVI available bands list.

At this point, the data are geolocated and ready to use in ENVI. Note that these data are created in ENVI in memory. They can be saved to a file by right-clicking on the data set heading (e.g. [Memory1]) in the Available Bands List and selecting "Save Selected File to Disk..." A dialog box appears for naming the output file and choosing its directory location.